

ACOUSTICAL ANALYSIS REPORT

Beauvais Major Subdivision – TM 5315
Old Castle Road
County of San Diego, California

3100 5315 (TM); Environmental Log No: 03-02-035;
APN: 185-230-91; KIVA Project: 04-13906

Prepared For

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Job #B00505N1

June 3, 2010

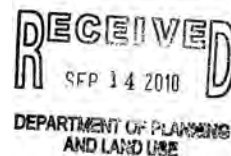


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1.0 EXECUTIVE SUMMARY

The proposed project, the Beauvais Major Subdivision (Tentative Map 5315), consists of the division of a parcel into seven single-family residential private lots. The project site is located on Old Castle Road in the community of Valley Center in the unincorporated area of the County of San Diego, California.

According to the County of San Diego, traffic noise is not expected to be an issue at proposed residences in the current or future noise environments as all proposed noise sensitive land use and buildable areas on site fall outside of the 60 CNEL traffic noise contour. For this reason, traffic noise has not been addressed within this noise report.

The County of San Diego and the State of California require interior noise levels not exceeding 45 CNEL in residential habitable space. As specified by the County of San Diego, noise levels at building facades are not expected to exceed 60 CNEL, and therefore, standard building construction is expected to be sufficient for achieving interior noise levels of 45 CNEL or less in proposed residences. No additional mitigation is deemed necessary.

Temporary construction noise was calculated to determine the impact this activity will have on surrounding residential properties. Section 36.409 of the County of San Diego Noise Ordinance states it is unlawful to operate construction equipment that exceeds an average sound level of 75 dB for an eight-hour period, between 7 a.m. and 7 p.m. when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is being received. Current proposed construction activities are expected to exceed County of San Diego noise regulations for temporary construction noise during some phases of construction, and therefore, temporary noise barriers are required during the grading of three of the seven pads. More details are provided in Section 5.3. Construction practices must also adhere to the guidelines set forth in the County of San Diego Noise Ordinance including limiting construction to the following hours: 7 a.m. to 7 p.m., Monday through Saturday (except legal holidays). Additionally, there will be no construction activity on Sunday. The recommended mitigation measures along with standard construction practices, reasonable maintenance of equipment, and conservative planning of simultaneous equipment operation will be sufficient to reduce the brief noise impacts.

2.0 INTRODUCTION

This acoustical analysis report is submitted to satisfy the acoustical requirements of the County of San Diego for Tentative Map (TM 5315) approval. Its purpose is to assess noise impacts from construction activities to identify project features or requirements necessary to remain in compliance with County of San Diego noise regulations for temporary construction noise.

All noise level or sound level values presented herein are expressed in terms of decibels, with A-weighting to approximate the hearing sensitivity of humans. Time-averaged noise levels are expressed by the symbol L_{EQ} , for a specified duration. The Community Noise Equivalent Level (CNEL) is a calculated 24-hour weighted average, where sound levels during evening hours of 7 p.m. to 10 p.m. have an added 5 dB weighting, and sound levels during nighttime hours of 10 p.m. to 7 a.m. have an added 10 dB weighting. This is similar to the Day-Night sound level, L_{DN} , which is a 24-hour average with an added 10 dB weighting on the same nighttime hours but no added weighting on the evening hours. Sound levels expressed in CNEL are always based on A-weighted decibels. These metrics are used to express noise levels for both measurement and municipal

regulations, for land use guidelines, and for enforcement of noise ordinances. Further explanation can be provided upon request.

2.1 Project Location

The project site is located on Old Castle Road in the community of Valley Center in the unincorporated area of the County of San Diego, California. The Assessor's Parcel Number (APN) for the property is 185-230-91. The project location is shown on the Vicinity Map, Figure 1, following this report. An Assessor's Parcel Map, Satellite Aerial Photograph, and Topographic Map are also provided as Figures 2 through 4, respectively.

2.2 Project Description

The proposed project consists of the division of a parcel into seven single-family residential private lots. The net lot areas are 2.00 acres for Lot 1, 2.00 acres for Lot 2, 7.81 acres for Lot 3, 3.45 acres for Lot 4, 2.89 acres for Lot 5, 2.02 acres for Lot 6, and 2.01 acres for Lot 7.

3.0 ENVIRONMENTAL SETTING

The primary noise source in the vicinity of the project site is traffic noise from Old Castle Road. Old Castle Road is a Light Collector roadway that is expected to carry 6,500 Average Daily Trips (ADT) in the future noise environment. According to preliminary analysis by the County of San Diego, the future traffic 60 CNEL contour would be located approximately 110 feet from the Old Castle Road centerline. All proposed noise sensitive land use and buildable areas on site are outside of this noise contour location. The County is requiring a noise restriction easement be dedicated to the tentative map to ensure that any future noise sensitive land uses within the 60 CNEL contour would comply with County noise standards. No further analysis of traffic noise is required at this time.

4.0 METHODOLOGY

4.1 Cadna Noise Modeling Software

Modeling of the outdoor noise environment for temporary construction noise is accomplished using Cadna Version 3.7, which is a model-based computer program developed by DataKustik for predicting noise impacts in a wide variety of conditions. Cadna (Computer Aided Noise Abatement) assists in the calculation, presentation, assessment, and mitigation of noise exposure. It allows for the input of project-specific information such as noise source data, barriers, structures, and topography to create a detailed CAD model and uses the most up-to-date calculation standards to predict outdoor noise impacts.

4.2 Summary of Site Specific Features Included in Cadna Model

Existing topographical contours present on the preliminary grading plan of the project site were included in the Cadna noise prediction model. Contours from 1170 feet to 1300 feet, by increments of 5-10 feet, were included. These are considered to be the only on-site permanent features that

will affect the noise propagation of the existing and proposed noise sources to the adjacent property lines

4.3 Calculated Noise Levels for Model Comparison

In order to validate the results of the Cadna noise prediction model, the noise impacts from the construction equipment were manually calculated as simple attenuation by distance. This was done for one of the receiver locations at each property line. These values were compared to those predicted by Cadna. The Cadna model includes additional attenuation due to intervening structures, topography, and ground absorption, to which the differences in modeled and calculated noise levels are attributed. This data is summarized in Table 1.

Table 1. Calculated Noise Levels for Model Comparison							
Noise Source	Receiver	Lot	Receiver Location	Distance from Source (ft)	Calculated Noise Level ² (dBA)	Cadna Model Noise Level ³ (dBA)	Difference (dB)
D8 Dozer, D6 Dozer, 966 Loader, Water Truck ¹	R2	7	North PL ⁵	225	72.8	70.9	1.9 ⁴
	R7	3	South PL	330	69.5	66.8	2.7 ⁴
	R5	1	East PL	89	80.9	79.6	1.3 ⁴
	R12	6	West PL	120	78.3	76.9	1.4 ⁴

¹40% duty cycle assumed for two dozers and loader, 20% duty cycle assumed for water truck.

²Calculated as attenuation by distance only, $L_2 = L_1 - 20\log(d_2 / d_1)$

³As predicted by Cadna model

⁴Differences between calculated and Cadna noise levels can be attributed to site topography

⁵Nearest property line to the north across Old Castle Road

5.0 IMPACTS AND MITIGATION

5.1 Exterior

As stated above, traffic noise is not expected to exceed 60 CNEL on site in the future noise environment, and therefore, no analysis of traffic noise is necessary at this time.

5.2 Interior

The State of California requires buildings to be designed in order to attenuate, control, and maintain interior noise levels to below 45 CNEL in habitable residential space. Current exterior building construction is generally expected to achieve at least 15 decibels of exterior-to-interior noise attenuation, with windows opened. Therefore, building structures exposed to exterior noise levels greater than 60 CNEL could be subject to interior noise levels exceeding the 45 CNEL noise limit for residential habitable space.

According to the County of San Diego, no buildable areas on site are expected to be exposed to greater than 60 CNEL in the current or future noise environment. For this reason, it is expected that interior noise levels will remain at or below 45 CNEL.

5.3 Temporary Construction Noise

Section 36.409 of the County of San Diego Noise Ordinance states it is unlawful to operate construction equipment that exceeds an average sound level of 75 dB for an eight-hour period, between 7 a.m. and 7 p.m. when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is being received. Please refer to Appendix B: Pertinent Sections of the County of San Diego Noise Ordinance. Refer to Table 2 for typical noise levels of construction equipment planned to be used on site.

Table 2. Typical Construction Equipment Noise Levels ¹		
Noise Source	Duty Cycle (%)	Measured Noise Level (L _{MAX}) at 50 feet (dBA)
Caterpillar D8 Dozer	40	86
Caterpillar D6 Dozer	40	85
Caterpillar 966 Loader	40	81
Water Truck	20	84 ²
Backhoe	40	78
Forklift	40	80 ²

¹Source: Federal Highway Administration (FHWA) Construction Noise Levels and Ranges, unless otherwise noted.

²Source: Wieland Associates, 1999.

Construction activities should be limited to the following hours: 7 a.m. to 7 p.m., Monday through Saturday (except legal holidays). There will be no construction activity on Sunday. Fences and gates will be installed as a control feature to limit after hours access to the construction site.

Construction scheduling information was obtained from Jerry Gaughan. Grading will be the first phase of construction, and will be accomplished using a Caterpillar D8 dozer, a Caterpillar D6 dozer, a Caterpillar 966 loader, and a water truck. According to Mr. Gaughan, all of this equipment may be in use simultaneously. There will be 7,350 cubic yards of cut and fill; however, there will be no import or export, and thus no dump trucks will be present. Site grading will take approximately 60 days. No blasting or other impulsive construction activity is anticipated. The next phase of construction consists of house construction. The pieces of equipment expected to operate on site at this time are a Caterpillar 420E Backhoe and a Skytrak 8042 forklift. Following the grading period, the construction of two houses will begin, and will be completed in five months. Two months from the first day of house construction, construction will begin on three additional homes and will also take five months to complete. Four months from the first day of house construction, construction will begin on the remaining two homes and will take five months to complete. The entire construction process will last for 11 months.

Temporary construction noise generated from the expected proposed construction on the project site is expected to exceed County of San Diego noise limits during the grading phase of construction. Noise sensitive receivers are located to the north, south, east and west. To approximate noise levels at these locations, the noise sources were calculated from the center of the each pad to each receiver to account for varying distance from source to receiver as equipment moves around the pad. Noise levels for each phase of construction are shown in Table 3. Detailed calculations can be found in Appendix C: Construction Equipment Noise Calculations. A graphical representation of receiver locations and noise contours is shown in Figures 5 and 6.

Table 3. Temporary Construction Noise Levels at Neighboring Properties			
Phase	Equipment Used	Receiver Location	8-Hour Average Noise Level (dBA)
PHASE I: GRADING	Cat D8 Dozer, Cat D6 Dozer, Cat 966 Loader, Water Truck	North1 (R-1) ¹	69.0
		North2 (R-2) ¹	73.1
		North3 (R-3) ¹	70.9
		East1 (R-4)	78.0
		East2 (R-5)	80.0
		East3 (R-6)	71.7
		South1 (R-7)	63.2
		South2 (R-8)	61.3
		West1 (R-9)	66.6
		West2 (R-10)	68.5
		West3 (R-11)	72.7
		West4 (R-12)	77.6
PHASE II: HOUSE CONSTRUCTION	Cat 420E Backhoe, Skytrak 8042 Forklift	North1 (R-1) ¹	61.0
		North2 (R-2) ¹	64.8
		North3 (R-3) ¹	62.7
		East1 (R-4)	70.2
		East2 (R-5)	72.2
		East3 (R-6)	63.6
		South1 (R-7)	55.5
		South2 (R-8)	53.8
		West1 (R-9)	58.3
		West2 (R-10)	60.3
		West3 (R-11)	65.1
		West4 (R-12)	69.6

¹Nearest property line to the north across Old Castle Road.

In order to approximate a worst-case noise environment, the noise levels shown above were calculated with the listed equipment operating on the center of each pad simultaneously. During the house construction phase, all receivers are shown to be in compliance even with the equipment operating on every pad simultaneously, which will not be the case. With these operating conditions during the grading phase of construction, noise levels are calculated to be out of compliance at two receivers at the east property line and one receiver on the west property line. For this reason, pad grading activities for Lots 1, 2, and 6 were evaluated individually to determine the necessary height and length of the barrier that will provide sufficient mitigation. Table 4 shows the receivers out of compliance and the necessary mitigation measures. Figure 7 shows a graphical representation of the proposed sound attenuation barriers.

Table 4. Construction Noise Impacts and Mitigation Measures				
Receiver	Lot Construction	Unmitigated Noise Level (dBA)	Mitigated Noise Level (dBA) ¹	Sound Barrier Height & Length
East2 (R-5/R-14)	2	79.6	66.3	8' High, 170' Long
East1 (R-4/R-15)	1	77.5	66.2	8' High, 190' Long
West4 (R-12/R-13)	6	76.9	64.5	8' High, 190' Long

¹Calculated at a distance of 10 feet beyond barrier wall to appropriately show barrier attenuation.

As the recommended walls are relatively consistent in the required height and length, the same barrier can be moved from one location to another as these three pads are graded. The approximate locations of the walls are shown in Figure 7. A temporary construction noise barrier should be solid and free of cracks or gaps through or below the wall. The wall should be a minimum of eight feet in height. Wood can be used if it is at least one-inch thick or has a density of at least 3.5 pounds per square foot. Sound attenuation blankets can be used in place of the barrier provided they have an STC rating of at least 18. Joe Shreves at SPL Services is a local representative who can provide sound attenuation blankets. He can be reached at 760-726-1062.

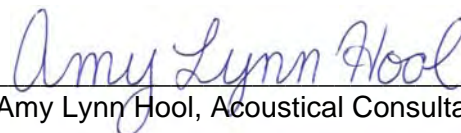
As shown above, it is determined that construction improvement activities will meet the San Diego temporary construction noise limit of 75 dBA at all adjacent property lines with the proposed mitigation in place while grading is taking place on Lots 1, 2, and 6, reasonable maintenance of equipment, and conservative planning of simultaneous equipment operation. Furthermore, equipment used in construction shall be maintained in proper operating condition, and engines shall be equipped with appropriate mufflers. With these recommendations, and controlled access to the site, it is expected that construction equipment noise levels will be at or below an average eight-hour equivalent noise level of 75 dBA, in compliance with County of San Diego regulations.

6.0 CERTIFICATION

The findings and recommendations of this acoustical analysis report are based on the information available and are a true and factual analysis of the potential acoustical issues associated with the Beauvais Major Subdivision project in the community of Valley Center in the unincorporated area of the County of San Diego, California. This report was prepared by Amy Lynn Hool and Douglas K. Eilar.



Douglas K. Eilar
Principal/Senior Acoustical Consultant

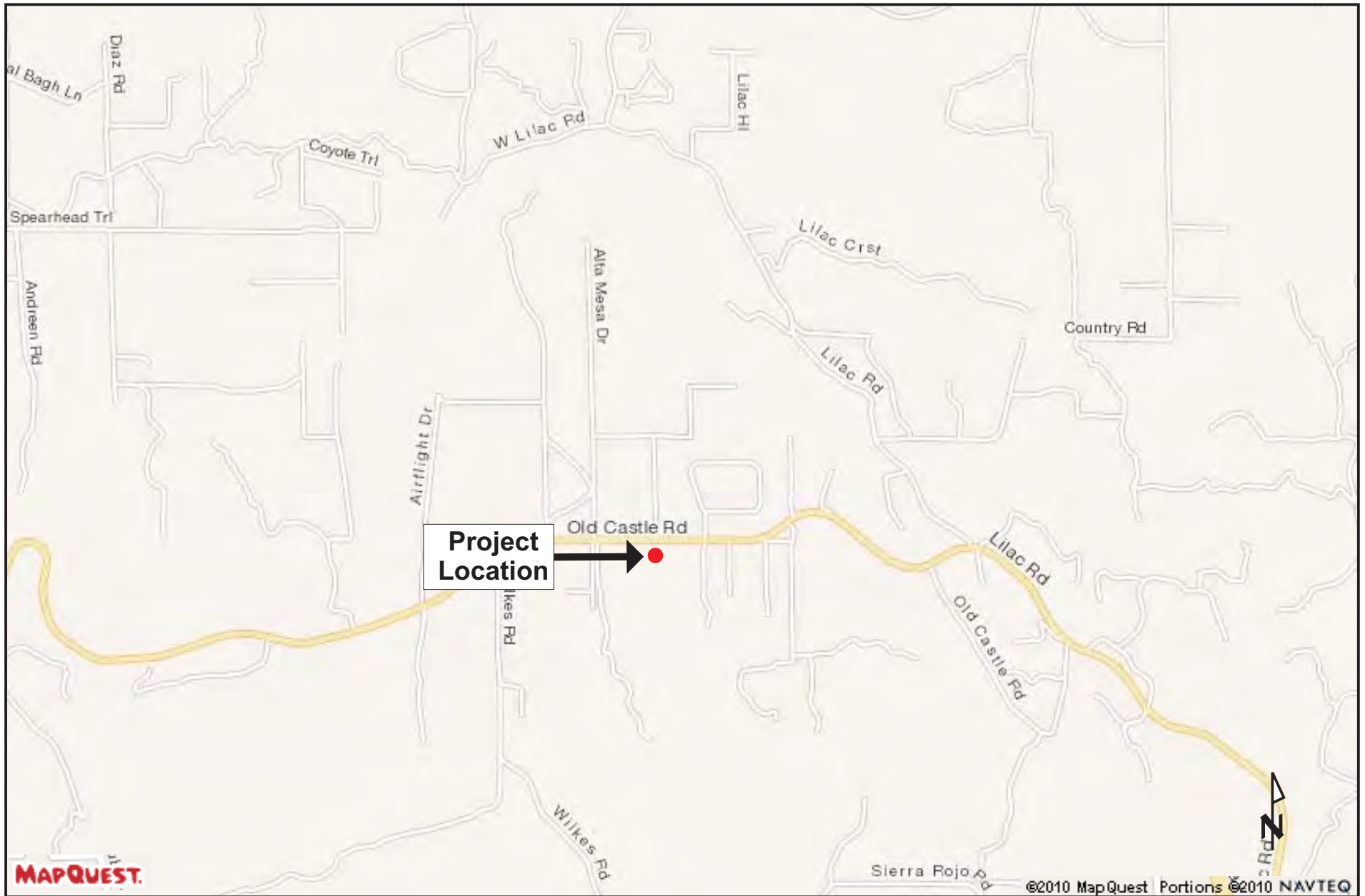


Amy Lynn Hool, Acoustical Consultant

7.0 REFERENCES

1. 2007 California Building Code, Based on the 2006 International Building Code, Chapter 12, Section 1207 - *Sound Transmission Control*.
2. County of San Diego Noise Element to the General Plan.
3. County of San Diego Noise Ordinance.
4. Harris, Cyril M., Handbook of Acoustical Measurements and Noise Control, 3rd Edition, Acoustical Society of America, 1998.
5. Heeden, Robert A., Compendium of Materials for Noise Control, U.S. Department of Health, Education and Welfare, National Institute for Occupational Safety and Health, November 1978.
6. Irvine, Leland K., Richards, Roy L., Acoustics and Noise Control Handbook for Architects and Builders, Kreiger Publishing Company, 1998.
7. NBS Building Sciences Series 77, Acoustical and Thermal Performance on Exterior Residential Walls, U.S. Department of Commerce/National Bureau of Standards, November 1976.
8. Western Electro-Acoustic Laboratory, Inc., 1711 Sixteenth Street, Santa Monica, California 90404, 213-80-9268, Sound Transmission Loss Vs. Glazing Type, Window Size and Air Filtration, January 1985. The research described in this report was prepared for the California Association of Window Manufacturers, 823 North Harbor Boulevard, Suite E, Fullerton, California 92632, 714-525-7088.
9. United States Department of Transportation Federal Highway Administration, Highway Construction Noise Handbook, Section 9.0 "Construction Equipment Noise Levels and Ranges," August 2006.
10. Wyle Laboratories, Development of Ground Transportation Systems Noise Contours for the San Diego Region, December, 1973

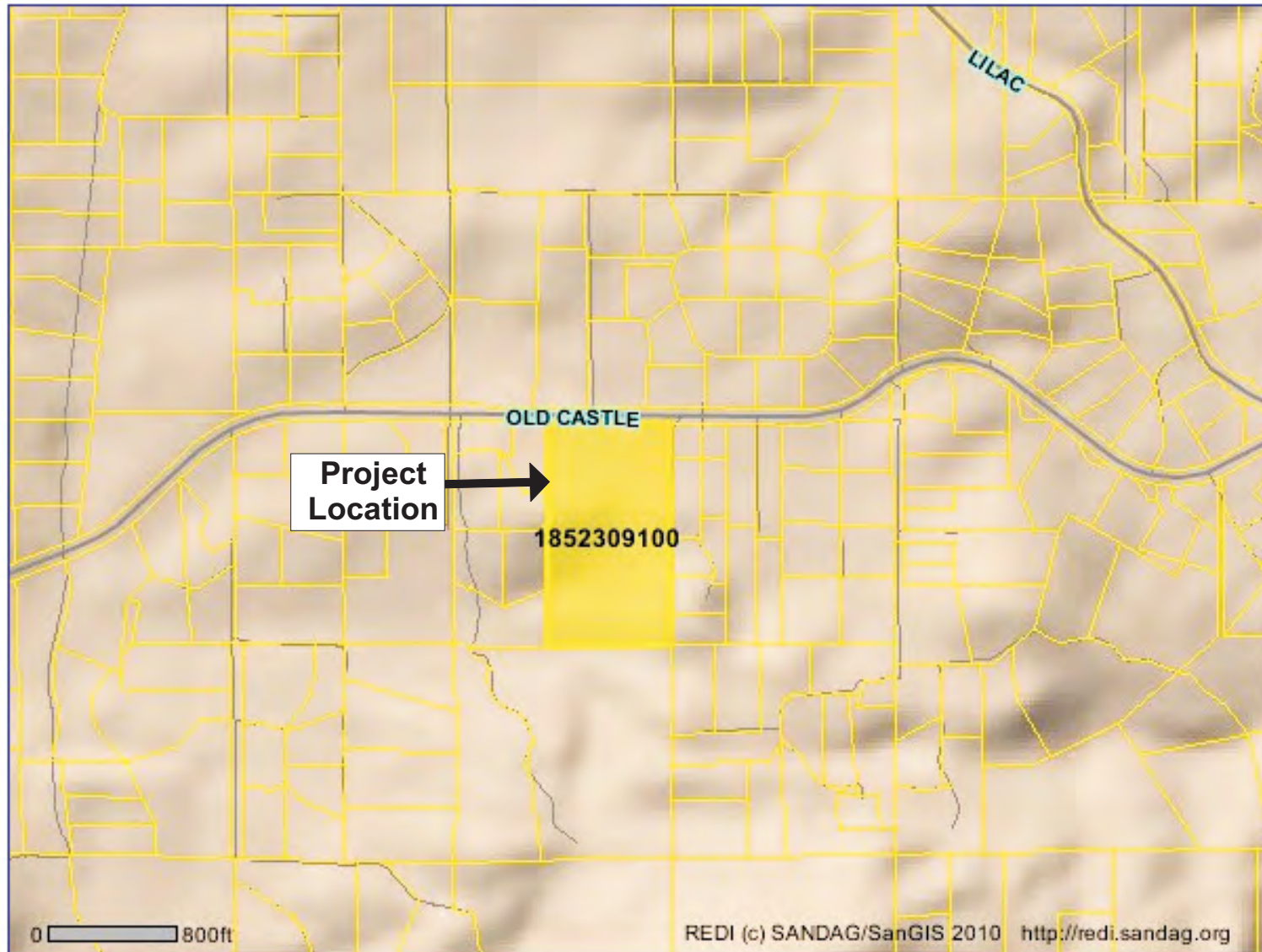
FIGURES



Eilar Associates, Inc.
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Vicinity Map
Job # B00505N1

Figure 1



San Diego County
Assessor's Parcel
Number:

185-230-91



SanGIS



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760-753-1865

Assessor's Parcel Map
Job # B00505N1

Figure 2



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Satellite Aerial Photograph
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Figure 3

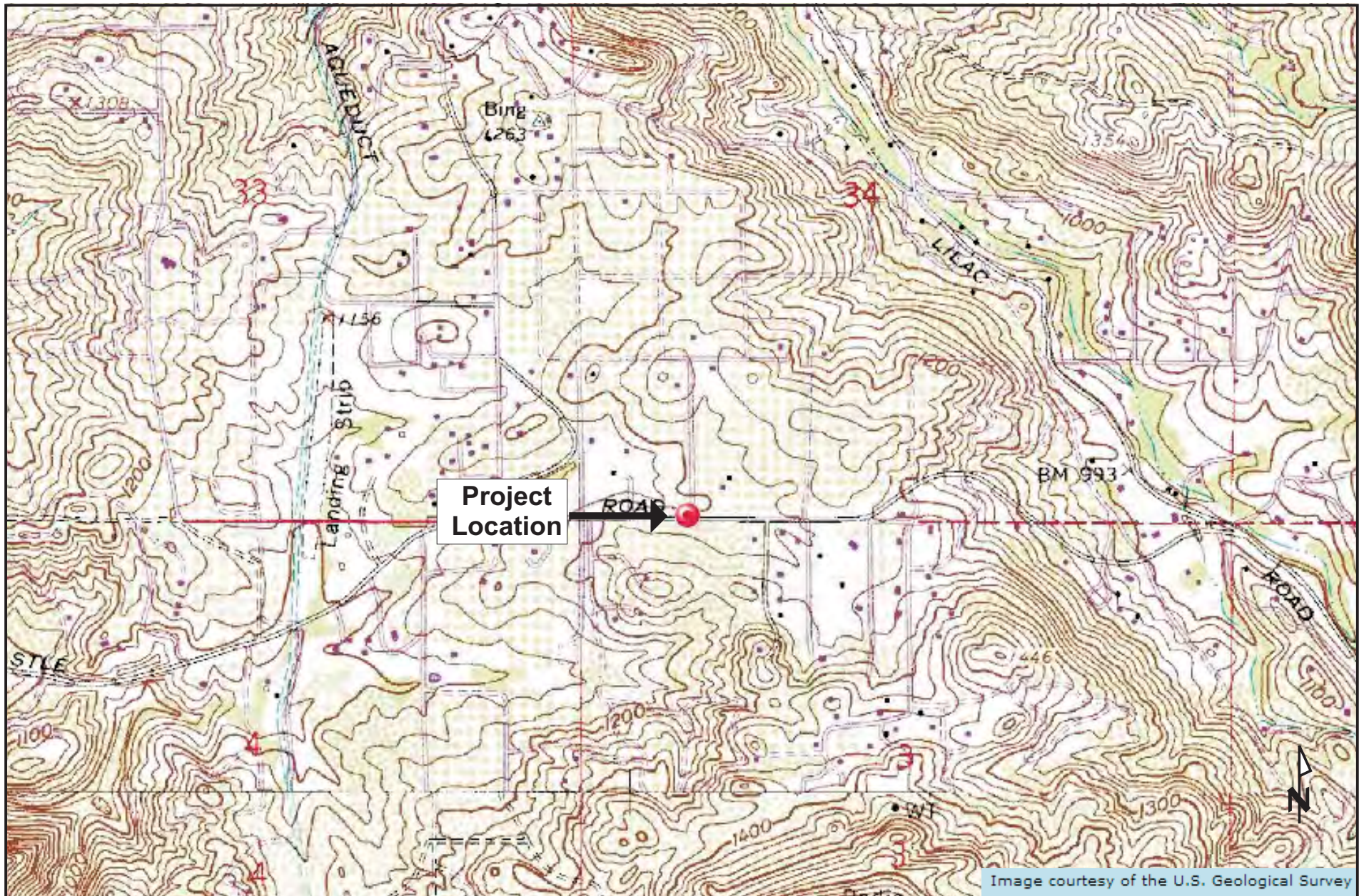
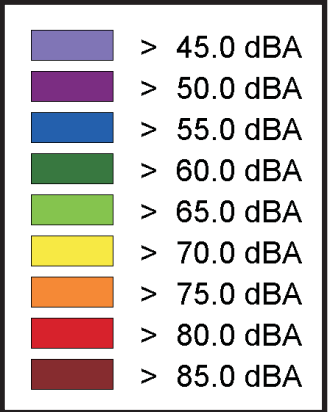
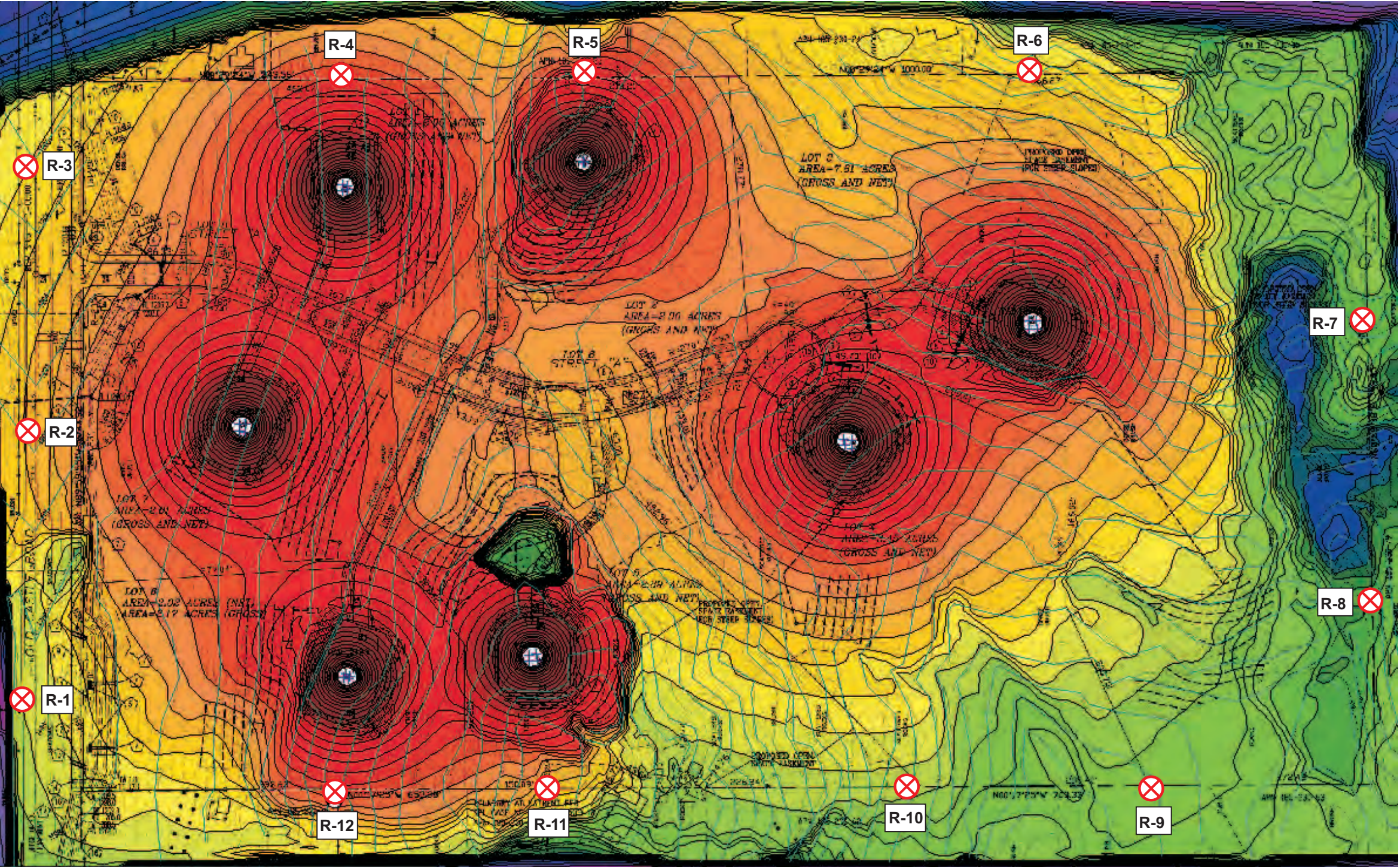


Image courtesy of the U.S. Geological Survey

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Topographic Map
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Figure 4



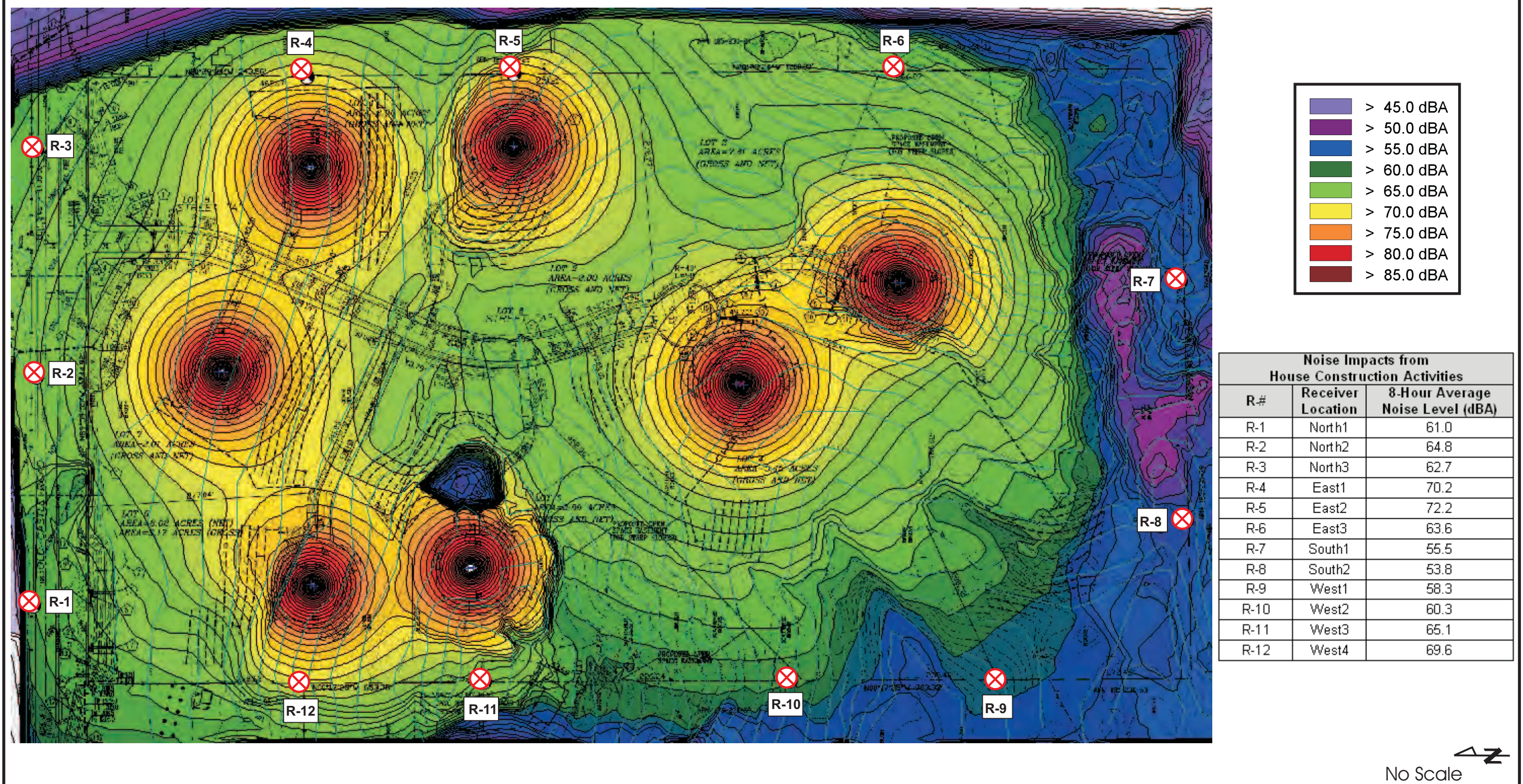
Noise Impacts from Grading Activities		
R-#	Receiver Location	8-Hour Average Noise Level (dBA)
R-1	North1	69.0
R-2	North2	73.1
R-3	North3	70.9
R-4	East1	78.0
R-5	East2	80.0
R-6	East3	71.7
R-7	South1	63.2
R-8	South2	61.3
R-9	West1	66.6
R-10	West2	68.5
R-11	West3	72.7
R-12	West4	77.6

No Scale

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Preliminary Grading Plan Showing Temporary Construction Noise
Impacts to Worst-Case Property Line Receiver Locations - Grading Phase
Job # B00505N1

Figure 5



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Preliminary Grading Plan Showing Temporary Construction Noise
Impacts to Worst-Case Property Line Receiver Locations - House Construction Phase
Job # B00505N1

Figure 6

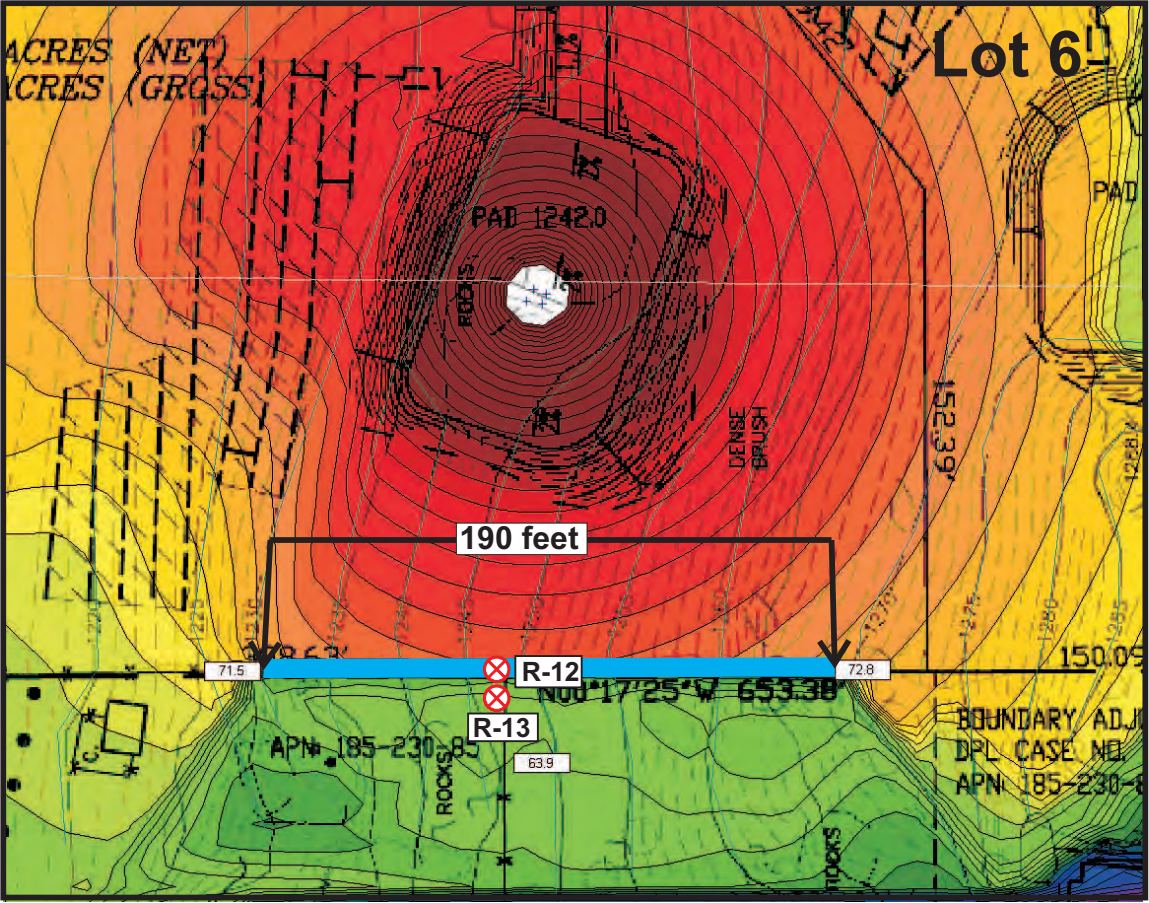
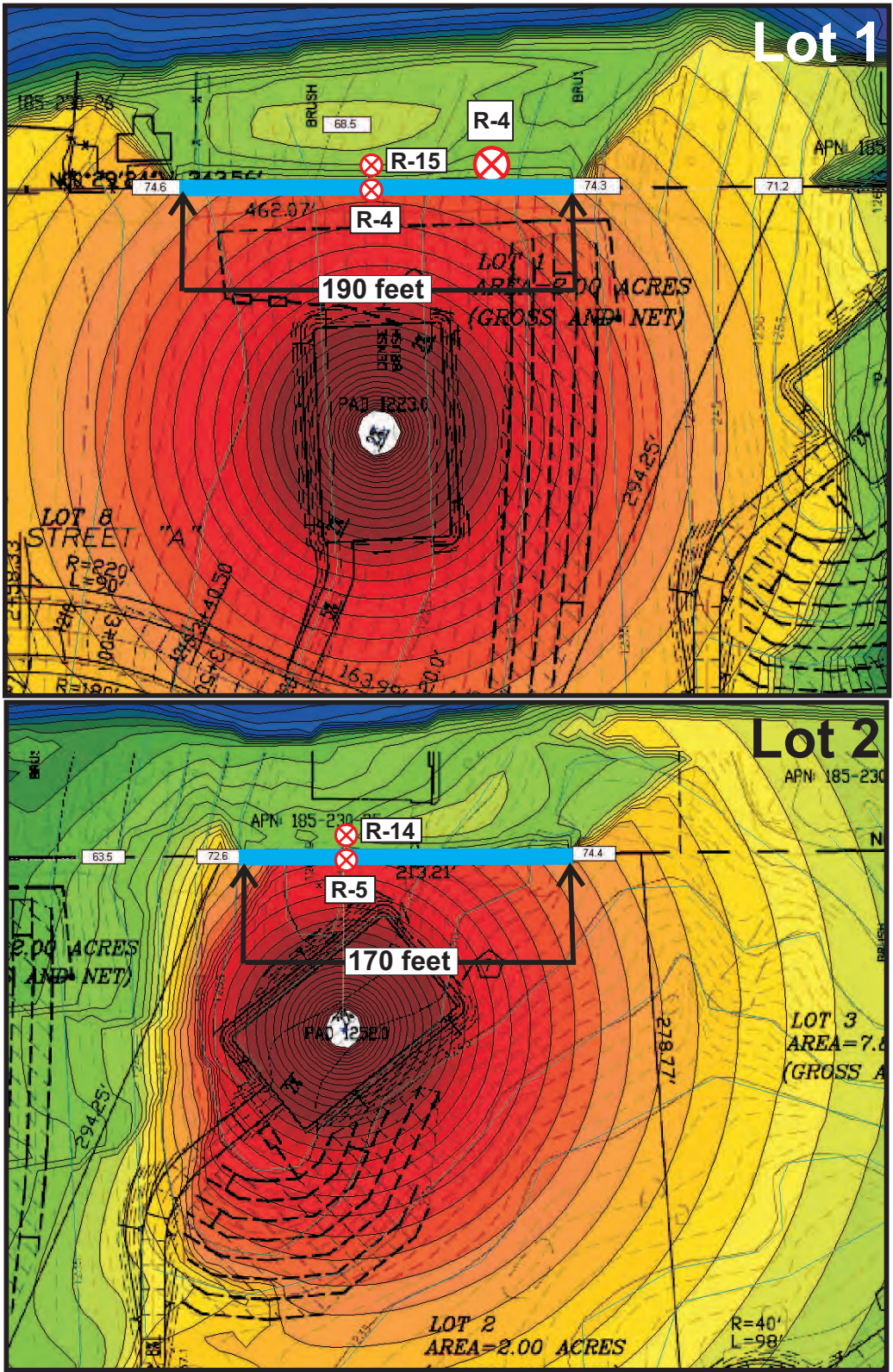
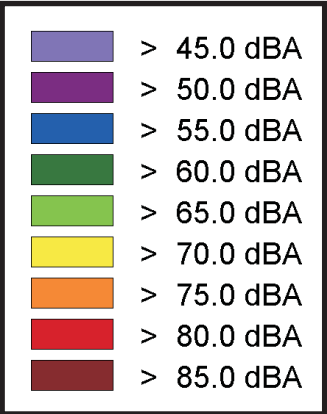


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West4 (R-12/R-13)	6	76.9	64.5	8' High, 190' Long

¹Calculated at a distance of 10 feet beyond barrier wall to appropriately show barrier attenuation.



 Proposed 8-foot high temporary sound attenuation barrier

No Scale 

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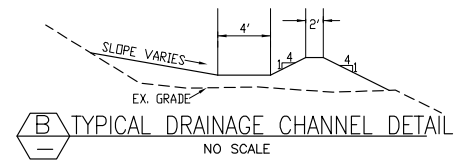
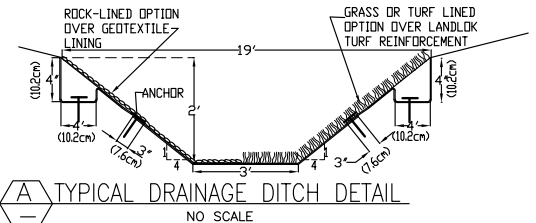
Portions of Preliminary Grading Plan Showing Recommended
Temporary Construction Noise Barrier Locations
Job # B00505N1

Figure 7

APPENDIX A

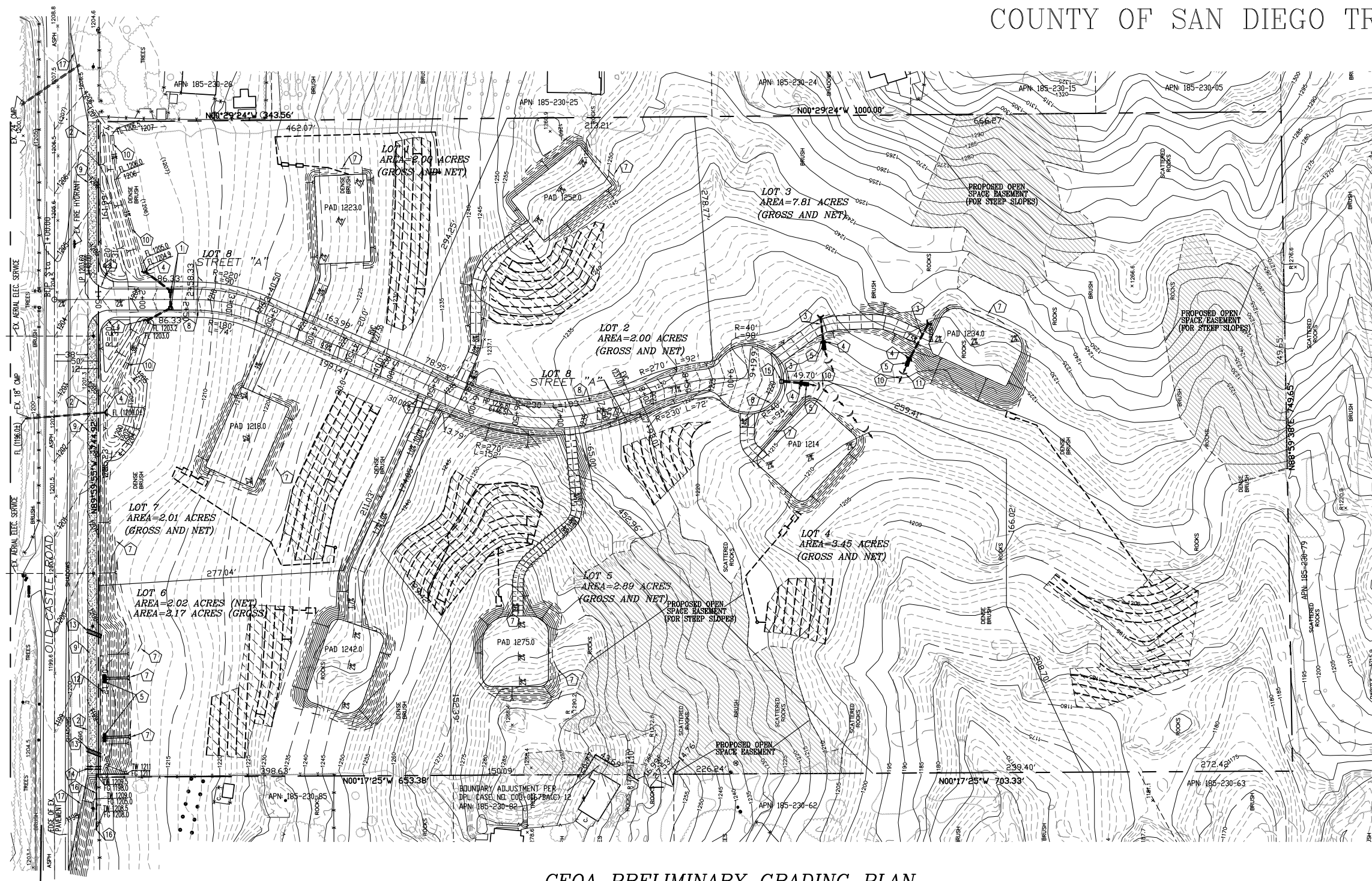
Site Plans

COUNTY OF SAN DIEGO TRACT NO. 5315 (RPL #5)
ER 03-02-035



CONSTRUCTION LEGEND

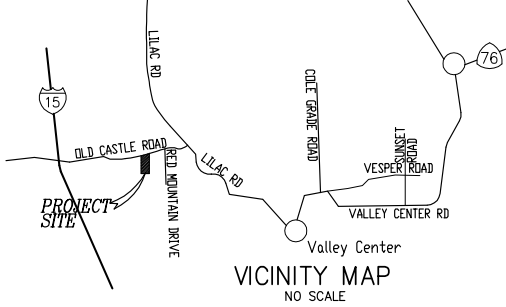
- 1 PROPOSED CATCH BASIN PER S.D.R.S.D. D-8
- 2 PROPOSED 6" CURB AND GUTTER PER S.D.R.S.D. G-2
- 3 PROPOSED DRAINAGE PIPE
- 4 PROPOSED HEADWALL
- 5 PROPOSED RIP RAP ENERGY DISSIPATER
- 6 PROPOSED LINED DRAINAGE DITCH PER DETAIL "A"
- 7 PROPOSED CONCRETE LINED DRAINAGE DITCH PER S.D.R.S.D. D-75
- 8 PROPOSED AC DIKE PER S.D.R.S.D. G-5 (TYPE A)
- 9 PROPOSED CLASS II (D.G.) PATHWAY
- 10 PROPOSED GRASS LINED CHANNEL PER DETAIL "B"
- 11 PROPOSED ROCK CHECK DAM (1.5" TO 6" DIAMETER STONE)
- 12 PROPOSED INFILTRATION CHANNEL
- 13 PROPOSED TYPE "A" CURB OUTLET PER S.D.R.S.D. D-25 (REVERSE FLOW FROM PAVEMENT TO INFILTRATION CHANNEL)
- 14 PROPOSED TYPE "A" CURB OUTLET PER S.D.R.S.D. D-25 (FLOW FROM INFILTRATION CHANNEL TO PAVEMENT)
- 15 PROPOSED TYPE "G" CATCH BASIN PER S.D.R.S.D. D-8
- 16 PROPOSED MASONRY RETAINING WALL
- 17 PROPOSED AC DIKE FOR PAVEMENT TRANSITION TAPER



SYMBOL LEGEND

DESCRIPTION	SYMBOL
ELEVATION, TOP OF FOOTING	TF
ELEVATION, TOP OF WALL	TW
ELEVATION, TOP OF CURB	TC
ELEVATION, FINISH SURFACE	FS
ELEVATION, FINISH GRADE	FG
ELEVATION, TOP OF GRATE	TG
ELEVATION, BOTTOM OF FOOTING	BF
ELEVATION, FLOW LINE	FL
ELEVATION, INVERT ELEVATION	IE
ELEVATION LABEL, EXISTING	(596.00)
ELEVATION LABEL, PROPOSED	596.00

DETAIL REFERENCE: CA 2X SHEET NO.



Scale: 1" = 60'

CIVIL ENGINEERING • LAND PLANNING

AQUATERRA Engineering Inc.
1843 Campeon Place
Oceanside, CA 92054
Tel: (760) 439-2800
Fax: (760) 439-2888

ENGINEER OF WORK
AQUATERRA ENGINEERING INC.
ADDRESS: 1843 CAMPEON PLACE
OCEANSIDE, CA 92054
TELE: (760) 439-2802

DATE: _____
GARY LIPSKA "RCE" 23080 EXPIRES 12/31/11

APPENDIX B

Pertinent Sections of the County of San Diego Noise Ordinance

SEC. 36.408. HOURS OF OPERATION OF CONSTRUCTION EQUIPMENT.

Except for emergency work, it shall be unlawful for any person to operate or cause to be operated, construction equipment:

(a) Between 7 p.m. and 7 a.m.

(b) On a Sunday or a holiday. For purposes of this section, a holiday means January 1st, the last Monday in May, July 4th, the first Monday in September, December 25th and any day appointed by the President as a special national holiday or the Governor of the State as a special State holiday. A person may, however, operate construction equipment on a Sunday or holiday between the hours of 10 a.m. and 5 p.m. at the person's residence or for the purpose of constructing a residence for himself or herself, provided that the operation of construction equipment is not carried out for financial consideration or other consideration of any kind and does not violate the limitations in sections [36.409](#) and [36.410](#).

(Amended by Ord. No. 9962 (N.S.), effective 1-9-09)

SEC. 36.409. SOUND LEVEL LIMITATIONS ON CONSTRUCTION EQUIPMENT.

Except for emergency work, it shall be unlawful for any person to operate construction equipment or cause construction equipment to be operated, that exceeds an average sound level of 75 decibels for an eight-hour period, between 7 a.m. and 7 p.m., when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is being received.

(Amended by Ord. No. 9700 (N.S.), effective 2-4-05; amended by Ord. No. 9962 (N.S.), effective 1-9-09)

SEC. 36.410. SOUND LEVEL LIMITATIONS ON IMPULSIVE NOISE.

In addition to the general limitations on sound levels in section 36.404 and the limitations on construction equipment in section [36.409](#), the following additional sound level limitations shall apply:

(a) Except for emergency work or work on a public road project, no person shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level shown in [Table 36.410A](#), when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25 percent of the minutes in the measurement period, as described in subsection (c) below. The maximum sound level depends on the use being made of the occupied property. The uses in [Table 36.410A](#) are as described in the County Zoning Ordinance.

TABLE 36.410A.
MAXIMUM SOUND LEVEL (IMPULSIVE) MEASURED AT OCCUPIED PROPERTY IN DECIBELS (dBA)

OCCUPIED PROPERTY USE	DECIBELS (dBA)
Residential, village zoning or civic use	82
Agricultural, commercial or industrial use	85

(b) Except for emergency work, no person working on a public road project shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level shown in [Table 36.410B](#), when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25 percent of the minutes in the measurement period, as described in subsection (c) below. The maximum sound level depends on the use being made of the occupied property. The uses in [Table 36.410B](#) are as described in the County Zoning Ordinance.

APPENDIX C

Construction Equipment Noise Calculations

Sources - Temporary Construction Noise (Grading)

Name	ID	Result. F	Lw / Li		Operating Time			Height	Coordinates		
		Day	Type	Value	Day	Special	Night		X	Y	Z
		(dBA)			(min)	(min)	(min)	(m)	(m)	(m)	(m)
Dozer1	S_1	120.4	Lw	S_1	24.00	0.00	0.00	1.52	103.09	133.64	380.13
Dozer2	S_2	119.4	Lw	S_2	24.00	0.00	0.00	1.52	104.28	133.11	380.23
Loader	S_3	115.6	Lw	S_3	24.00	0.00	0.00	1.52	102.43	132.45	380.12
Water Truck	S_4	118.2	Lw	S_4	12.00	0.00	0.00	1.52	103.88	132.18	380.23
Dozer1	S_5	120.4	Lw	S_1	24.00	0.00	0.00	1.52	179.12	298.16	383.49
Dozer2	S_6	119.4	Lw	S_2	24.00	0.00	0.00	1.52	179.31	298.16	383.47
Loader	S_7	115.6	Lw	S_3	24.00	0.00	0.00	1.52	179.19	297.79	383.46
Water Truck	S_8	118.2	Lw	S_4	12.00	0.00	0.00	1.52	179.39	297.91	383.46
Dozer1	S_9	120.4	Lw	S_1	24.00	0.00	0.00	1.52	102.08	290.46	374.10
Dozer2	S_10	119.4	Lw	S_2	24.00	0.00	0.00	1.52	103.57	290.28	374.25
Loader	S_11	115.6	Lw	S_3	24.00	0.00	0.00	1.52	102.16	288.60	374.10
Water Truck	S_12	118.2	Lw	S_4	12.00	0.00	0.00	1.52	103.47	289.10	374.23
Dozer1	S_13	120.4	Lw	S_1	24.00	0.00	0.00	1.52	68.81	213.77	372.80
Dozer2	S_14	119.4	Lw	S_2	24.00	0.00	0.00	1.52	70.66	213.77	373.01
Loader	S_15	115.6	Lw	S_3	24.00	0.00	0.00	1.52	68.81	211.65	372.90
Water Truck	S_16	118.2	Lw	S_4	12.00	0.00	0.00	1.52	70.66	211.39	373.12
Dozer1	S_17	120.4	Lw	S_1	24.00	0.00	0.00	1.52	161.95	139.95	389.41
Dozer2	S_18	119.4	Lw	S_2	24.00	0.00	0.00	1.52	164.06	140.21	389.52
Loader	S_19	115.6	Lw	S_3	24.00	0.00	0.00	1.52	161.95	137.83	389.47
Water Truck	S_20	118.2	Lw	S_4	12.00	0.00	0.00	1.52	164.59	137.83	389.62
Dozer1	S_21	120.4	Lw	S_1	24.00	0.00	0.00	1.52	262.76	209.01	371.07
Dozer2	S_22	119.4	Lw	S_2	24.00	0.00	0.00	1.52	265.40	208.74	370.88
Loader	S_23	115.6	Lw	S_3	24.00	0.00	0.00	1.52	263.02	207.16	370.92
Water Truck	S_24	118.2	Lw	S_4	12.00	0.00	0.00	1.52	265.14	206.10	370.70
Dozer1	S_25	120.4	Lw	S_1	24.00	0.00	0.00	1.52	322.29	247.11	377.25
Dozer2	S_26	119.4	Lw	S_2	24.00	0.00	0.00	1.52	324.41	247.11	377.31
Loader	S_27	115.6	Lw	S_3	24.00	0.00	0.00	1.52	322.29	244.46	377.10
Water Truck	S_28	118.2	Lw	S_4	12.00	0.00	0.00	1.52	324.67	244.20	377.15

Receivers - Temporary Construction Noise (Grading)

Name	ID	Level Lr	Height	Coordinates		
		Day		X	Y	Z
		(dBA)	(m)	(m)	(m)	(m)
North1	1	69.0	1.52	-0.72	125.79	367.32
North2	2	73.1	1.52	0.32	211.80	367.93
North3	3	70.9	1.52	0.22	296.65	369.05
East1	4	78.0	1.52	101.69	324.31	374.13
East2	5	80.0	1.52	179.28	325.42	385.37
East3	6	71.7	1.52	322.90	326.85	398.49
South1	7	63.2	1.52	429.37	247.51	384.41
South2	8	61.3	1.52	431.37	157.84	365.44
West1	9	66.6	1.52	360.70	97.50	359.44
West2	10	68.5	1.52	283.03	97.83	367.61
West3	11	72.7	1.52	168.02	97.17	393.19
West4	12	77.6	1.52	99.25	96.73	381.72
West4-10' Beyond Barrier	13	76.9	1.52	99.21	93.65	381.51
East2-10' Beyond Barrier	14	79.1	1.52	179.32	328.38	385.16
East1-10' Beyond Barrier	15	77.4	1.52	101.52	327.13	374.18

Receivers - Temporary Construction Noise (Grading), Lot 2, No Mitigation

Name	M. ID	Level Lr		Limit. Value		Land Use			Height		Coordinates		
		Day	Night	Day	Night	Type	Auto	Noise Type			X	Y	Z
		(dBA)	(dBA)	(dBA)	(dBA)				(m)		(m)	(m)	(m)
North1	1	54.1	-88.0	0.0	0.0		x	Total	1.52	r	-0.72	125.79	367.32
North2	2	56.2	-88.0	0.0	0.0		x	Total	1.52	r	0.32	211.80	367.93
North3	3	57.1	-88.0	0.0	0.0		x	Total	1.52	r	0.22	296.65	369.05
East1	4	59.4	-88.0	0.0	0.0		x	Total	1.52	r	101.69	324.31	374.13
East2	5	79.6	-88.0	0.0	0.0		x	Total	1.52	r	179.28	325.42	385.37
East3	6	63.5	-88.0	0.0	0.0		x	Total	1.52	r	322.90	326.85	398.49
South1	7	53.6	-88.0	0.0	0.0		x	Total	1.52	r	429.37	247.51	384.41
South2	8	51.7	-88.0	0.0	0.0		x	Total	1.52	r	431.37	157.84	365.44
West1	9	57.1	-88.0	0.0	0.0		x	Total	1.52	r	360.70	97.50	359.44
West2	10	59.0	-88.0	0.0	0.0		x	Total	1.52	r	283.03	97.83	367.61
West3	11	57.4	-88.0	0.0	0.0		x	Total	1.52	r	168.02	97.17	393.19
West4	12	57.7	-88.0	0.0	0.0		x	Total	1.52	r	99.25	96.73	381.72
West4-10' Beyond Barrier	13	56.2	-88.0	0.0	0.0		x	Total	1.52	r	99.21	93.65	381.51
East2-10' Beyond Barrier	14	78.5	-88.0	0.0	0.0		x	Total	1.52	r	179.32	328.38	385.16
East1-10' Beyond Barrier	15	59.3	-88.0	0.0	0.0		x	Total	1.52	r	101.52	327.13	374.18

Receivers - Temporary Construction Noise (Grading), Lot 2, With Mitigation

Name	M. ID	Level Lr		Limit. Value		Land Use			Height		Coordinates		
		Day	Night	Day	Night	Type	Auto	Noise Type			X	Y	Z
		(dBA)	(dBA)	(dBA)	(dBA)				(m)		(m)	(m)	(m)
North1	1	54.1	-88.0	0.0	0.0		x	Total	1.52	r	-0.72	125.79	367.32
North2	2	56.2	-88.0	0.0	0.0		x	Total	1.52	r	0.32	211.80	367.93
North3	3	57.1	-88.0	0.0	0.0		x	Total	1.52	r	0.22	296.65	369.05
East1	4	59.4	-88.0	0.0	0.0		x	Total	1.52	r	101.69	324.31	374.13
East2	5	64.4	-88.0	0.0	0.0		x	Total	1.52	r	179.28	325.42	385.37
East3	6	63.5	-88.0	0.0	0.0		x	Total	1.52	r	322.90	326.85	398.49
South1	7	53.6	-88.0	0.0	0.0		x	Total	1.52	r	429.37	247.51	384.41
South2	8	51.7	-88.0	0.0	0.0		x	Total	1.52	r	431.37	157.84	365.44
West1	9	57.1	-88.0	0.0	0.0		x	Total	1.52	r	360.70	97.50	359.44
West2	10	59.0	-88.0	0.0	0.0		x	Total	1.52	r	283.03	97.83	367.61
West3	11	57.4	-88.0	0.0	0.0		x	Total	1.52	r	168.02	97.17	393.19
West4	12	57.7	-88.0	0.0	0.0		x	Total	1.52	r	99.25	96.73	381.72
West4-10' Beyond Barrier	13	56.2	-88.0	0.0	0.0		x	Total	1.52	r	99.21	93.65	381.51
East2-10' Beyond Barrier	14	66.3	-88.0	0.0	0.0		x	Total	1.52	r	179.32	328.38	385.16
East1-10' Beyond Barrier	15	59.3	-88.0	0.0	0.0		x	Total	1.52	r	101.52	327.13	374.18

Receivers - Temporary Construction Noise (Grading), Lot 1, No Mitigation

Name	M. ID	Level Lr		Limit. Value		Land Use			Height		Coordinates		
		Day	Night	Day	Night	Type	Auto	Noise Type			X	Y	Z
		(dBA)	(dBA)	(dBA)	(dBA)				(m)		(m)	(m)	(m)
North1	1	56.5	-88.0	0.0	0.0		x	Total	1.52	r	-0.72	125.79	367.32
North2	2	64.9	-88.0	0.0	0.0		x	Total	1.52	r	0.32	211.80	367.93
North3	3	67.1	-88.0	0.0	0.0		x	Total	1.52	r	0.22	296.65	369.05
East1	4	77.5	-88.0	0.0	0.0		x	Total	1.52	r	101.69	324.31	374.13
East2	5	55.8	-88.0	0.0	0.0		x	Total	1.52	r	179.28	325.42	385.37
East3	6	54.4	-88.0	0.0	0.0		x	Total	1.52	r	322.90	326.85	398.49
South1	7	42.1	-88.0	0.0	0.0		x	Total	1.52	r	429.37	247.51	384.41
South2	8	38.7	-88.0	0.0	0.0		x	Total	1.52	r	431.37	157.84	365.44
West1	9	41.0	-88.0	0.0	0.0		x	Total	1.52	r	360.70	97.50	359.44
West2	10	42.0	-88.0	0.0	0.0		x	Total	1.52	r	283.03	97.83	367.61
West3	11	55.8	-88.0	0.0	0.0		x	Total	1.52	r	168.02	97.17	393.19
West4	12	60.7	-88.0	0.0	0.0		x	Total	1.52	r	99.25	96.73	381.72
West4-10' Beyond Barrier	13	60.5	-88.0	0.0	0.0		x	Total	1.52	r	99.21	93.65	381.51
East2-10' Beyond Barrier	14	57.3	-88.0	0.0	0.0		x	Total	1.52	r	179.32	328.38	385.16
East1-10' Beyond Barrier	15	76.8	-88.0	0.0	0.0		x	Total	1.52	r	101.52	327.13	374.18

Receivers - Temporary Construction Noise (Grading), Lot 1, With Mitigation

Name	M. ID	Level Lr		Limit. Value		Land Use			Height		Coordinates		
		Day	Night	Day	Night	Type	Auto	Noise Type			X	Y	Z
		(dBA)	(dBA)	(dBA)	(dBA)				(m)		(m)	(m)	(m)
North1	1	56.5	-88.0	0.0	0.0		x	Total	1.52	r	-0.72	125.79	367.32
North2	2	64.9	-88.0	0.0	0.0		x	Total	1.52	r	0.32	211.80	367.93
North3	3	67.1	-88.0	0.0	0.0		x	Total	1.52	r	0.22	296.65	369.05
East1	4	77.5	-88.0	0.0	0.0		x	Total	1.52	r	101.69	324.31	374.13
East2	5	55.8	-88.0	0.0	0.0		x	Total	1.52	r	179.28	325.42	385.37
East3	6	54.4	-88.0	0.0	0.0		x	Total	1.52	r	322.90	326.85	398.49
South1	7	42.1	-88.0	0.0	0.0		x	Total	1.52	r	429.37	247.51	384.41
South2	8	38.7	-88.0	0.0	0.0		x	Total	1.52	r	431.37	157.84	365.44
West1	9	41.0	-88.0	0.0	0.0		x	Total	1.52	r	360.70	97.50	359.44
West2	10	42.0	-88.0	0.0	0.0		x	Total	1.52	r	283.03	97.83	367.61
West3	11	55.8	-88.0	0.0	0.0		x	Total	1.52	r	168.02	97.17	393.19
West4	12	60.7	-88.0	0.0	0.0		x	Total	1.52	r	99.25	96.73	381.72
West4-10' Beyond Barrier	13	60.5	-88.0	0.0	0.0		x	Total	1.52	r	99.21	93.65	381.51
East2-10' Beyond Barrier	14	57.3	-88.0	0.0	0.0		x	Total	1.52	r	179.32	328.38	385.16
East1-10' Beyond Barrier	15	66.2	-88.0	0.0	0.0		x	Total	1.52	r	101.52	327.13	374.18

Receivers - Temporary Construction Noise (Grading), Lot 6, No Mitigation

Name	M. ID	Level Lr		Limit. Value		Land Use			Height		Coordinates		
		Day	Night	Day	Night	Type	Auto	Noise Type			X	Y	Z
		(dBA)	(dBA)	(dBA)	(dBA)				(m)		(m)	(m)	(m)
North1	1	66.8	-88.0	0.0	0.0		x	Total	1.52	r	-0.72	125.79	367.32
North2	2	64.7	-88.0	0.0	0.0		x	Total	1.52	r	0.32	211.80	367.93
North3	3	60.8	-88.0	0.0	0.0		x	Total	1.52	r	0.22	296.65	369.05
East1	4	61.0	-88.0	0.0	0.0		x	Total	1.52	r	101.69	324.31	374.13
East2	5	46.5	-88.0	0.0	0.0		x	Total	1.52	r	179.28	325.42	385.37
East3	6	52.1	-88.0	0.0	0.0		x	Total	1.52	r	322.90	326.85	398.49
South1	7	42.3	-88.0	0.0	0.0		x	Total	1.52	r	429.37	247.51	384.41
South2	8	36.6	-88.0	0.0	0.0		x	Total	1.52	r	431.37	157.84	365.44
West1	9	36.1	-88.0	0.0	0.0		x	Total	1.52	r	360.70	97.50	359.44
West2	10	39.0	-88.0	0.0	0.0		x	Total	1.52	r	283.03	97.83	367.61
West3	11	65.8	-88.0	0.0	0.0		x	Total	1.52	r	168.02	97.17	393.19
West4	12	76.9	-88.0	0.0	0.0		x	Total	1.52	r	99.25	96.73	381.72
West4-10' Beyond Barrier	13	76.1	-88.0	0.0	0.0		x	Total	1.52	r	99.21	93.65	381.51
East2-10' Beyond Barrier	14	49.3	-88.0	0.0	0.0		x	Total	1.52	r	179.32	328.38	385.16
East1-10' Beyond Barrier	15	51.6	-88.0	0.0	0.0		x	Total	1.52	r	101.52	327.13	374.18

Receivers - Temporary Construction Noise (Grading), Lot 6, With Mitigation

Name	M. ID	Level Lr		Limit. Value		Land Use			Height		Coordinates		
		Day	Night	Day	Night	Type	Auto	Noise Type			X	Y	Z
		(dBA)	(dBA)	(dBA)	(dBA)				(m)		(m)	(m)	(m)
North1	1	66.8	-88.0	0.0	0.0		x	Total	1.52	r	-0.72	125.79	367.32
North2	2	64.7	-88.0	0.0	0.0		x	Total	1.52	r	0.32	211.80	367.93
North3	3	60.8	-88.0	0.0	0.0		x	Total	1.52	r	0.22	296.65	369.05
East1	4	61.0	-88.0	0.0	0.0		x	Total	1.52	r	101.69	324.31	374.13
East2	5	46.5	-88.0	0.0	0.0		x	Total	1.52	r	179.28	325.42	385.37
East3	6	52.1	-88.0	0.0	0.0		x	Total	1.52	r	322.90	326.85	398.49
South1	7	42.3	-88.0	0.0	0.0		x	Total	1.52	r	429.37	247.51	384.41
South2	8	36.6	-88.0	0.0	0.0		x	Total	1.52	r	431.37	157.84	365.44
West1	9	36.1	-88.0	0.0	0.0		x	Total	1.52	r	360.70	97.50	359.44
West2	10	39.0	-88.0	0.0	0.0		x	Total	1.52	r	283.03	97.83	367.61
West3	11	65.8	-88.0	0.0	0.0		x	Total	1.52	r	168.02	97.17	393.19
West4	12	76.9	-88.0	0.0	0.0		x	Total	1.52	r	99.25	96.73	381.72
West4-10' Beyond Barrier	13	64.5	-88.0	0.0	0.0		x	Total	1.52	r	99.21	93.65	381.51
East2-10' Beyond Barrier	14	49.3	-88.0	0.0	0.0		x	Total	1.52	r	179.32	328.38	385.16
East1-10' Beyond Barrier	15	51.6	-88.0	0.0	0.0		x	Total	1.52	r	101.52	327.13	374.18

Sources - Temporary Construction Noise (House Construction)

Name	ID	Result	Lw / Li		Operating Time			Height		Coordinates		
		Day	Type	Value	Day	Special	Night			X	Y	Z
		(dBA)			(min)	(min)	(min)	(m)		(m)	(m)	(m)
Backhoe	S_1	112.6	Lw	S_5	24.00	0.00	0.00	1.52	r	103.09	133.64	380.13
Forklift	S_2	114.6	Lw	S_6	24.00	0.00	0.00	1.52	r	104.28	133.11	380.23
Backhoe	S_5	112.6	Lw	S_5	24.00	0.00	0.00	1.52	r	179.12	298.16	383.49
Forklift	S_6	114.6	Lw	S_6	24.00	0.00	0.00	1.52	r	179.31	298.16	383.47
Backhoe	S_9	112.6	Lw	S_5	24.00	0.00	0.00	1.52	r	102.08	290.46	374.10
Forklift	S_10	114.6	Lw	S_6	24.00	0.00	0.00	1.52	r	103.57	290.28	374.25
Backhoe	S_13	112.6	Lw	S_5	24.00	0.00	0.00	1.52	r	68.81	213.77	372.80
Forklift	S_14	114.6	Lw	S_6	24.00	0.00	0.00	1.52	r	70.66	213.77	373.01
Backhoe	S_17	112.6	Lw	S_5	24.00	0.00	0.00	1.52	r	161.95	139.95	389.41
Forklift	S_18	114.6	Lw	S_6	24.00	0.00	0.00	1.52	r	164.06	140.21	389.52
Backhoe	S_21	112.6	Lw	S_5	24.00	0.00	0.00	1.52	r	262.76	209.01	371.07
Forklift	S_22	114.6	Lw	S_6	24.00	0.00	0.00	1.52	r	265.40	208.74	370.88
Backhoe	S_25	112.6	Lw	S_5	24.00	0.00	0.00	1.52	r	322.29	247.11	377.25
Forklift	S_26	114.6	Lw	S_6	24.00	0.00	0.00	1.52	r	324.41	247.11	377.31

Receivers - Temporary Construction Noise (House Construction)

Name	M.	ID	Level Lr		Limit. Value		Land Use			Height		Coordinates		
			Day	Night	Day	Night	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)				(m)		(m)	(m)	(m)
North1		1	61.0	-88.0	0.0	0.0		x	Total	1.52	r	-0.72	125.79	367.32
North2		2	64.8	-88.0	0.0	0.0		x	Total	1.52	r	0.32	211.80	367.93
North3		3	62.7	-88.0	0.0	0.0		x	Total	1.52	r	0.22	296.65	369.05
East1		4	70.2	-88.0	0.0	0.0		x	Total	1.52	r	101.69	324.31	374.13
East2		5	72.2	-88.0	0.0	0.0		x	Total	1.52	r	179.28	325.42	385.37
East3		6	63.6	-88.0	0.0	0.0		x	Total	1.52	r	322.90	326.85	398.49
South1		7	55.5	-88.0	0.0	0.0		x	Total	1.52	r	429.37	247.51	384.41
South2		8	53.8	-88.0	0.0	0.0		x	Total	1.52	r	431.37	157.84	365.43
West1		9	58.3	-88.0	0.0	0.0		x	Total	1.52	r	360.70	97.50	359.44
West2		10	60.3	-88.0	0.0	0.0		x	Total	1.52	r	283.03	97.83	367.61
West3		11	65.1	-88.0	0.0	0.0		x	Total	1.52	r	168.02	97.17	393.19
West4		12	69.6	-88.0	0.0	0.0		x	Total	1.52	r	99.25	96.73	381.72